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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,627	04/09/2004	Carlos Angulo Barrios	1153.087US1	8932
21186 7590 06/28/2007 SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			EXAMINER PAK, SUNG H	
			ART UNIT 2874	PAPER NUMBER
			MAIL DATE 06/28/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/821,627

Applicant(s)

BARRIOS ET AL.

Examiner

Sung H. Pak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Response to Amendment***

Applicants' amendment filed 4/19/2007 has been entered. All pending claims have been carefully reconsidered in view of the amendment. However, the amendment fails to overcome the ground of rejection presented in the previous office action, and the claim rejections are made final in the present office action.

Pending claims are amended to recite, *inter alia*, "non-active" region of a PIN diode (e.g. claims 25, 48), or means for controlling the concentration of free carriers "to vary the refractive index of the optical resonator cavity." (e.g. claim 36).

It is respectfully noted that newly added claim limitations presented in the claim amendment are "functional language" limitations, where an "apparatus" claim is further limited by functions performed by the claimed apparatus.

As stated in MPEP §2114, "[w]hile features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function." *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). A claim containing "a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). As such, while the functional language limitations are not ignored, such limitations are not given

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patentable weight, and the claimed limitations are anticipated if a prior art apparatus is capable of performing the claimed function. MPEP §2114.

In the present case, the device of the prior art reference fully anticipates “non-active” region of a PIN diode, because such region is “non-active” as long as the device is not energized, and not be active. Further, even if the prior art does not explicitly disclose that its means for controlling the concentration of free carriers “vary the refractive index of the resonator cavity”, the refractive index of the resonator cavity is necessarily and inherently changed as the device generates laser beam.

Although applicants’ arguments, alleging that the device of the present application is a resonator while the device of the applied prior art is a laser, are appreciated by the examiner, it is respectfully noted that the prior art device fully anticipates the claimed invention (at least for claims 25-47), as it is currently recited in the instant application.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Xu et al (US 5,563,902).

Xu reference discloses an optical device with all the limitations set forth in the above-mentioned claims, including: a waveguide (e.g. ‘320’ Fig. 7B); an optical resonant cavity

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optically coupled to the waveguide (e.g. '25' Fig. 7B); a p+ doped area formed on a first side of the optical resonant cavity ('45' Fig. 7B); an n+ doped area formed on a second side of the optical resonant cavity ('40' Fig. 7B) such that the optical resonant cavity forms an intrinsic region of a PIN diode (col. 3, ll. 22-30);

wherein carriers are injected into the optical resonant cavity by applying a voltage across the p+ and n+ doped areas to change the resonant frequency of the optical resonant cavity (col. 4, ll. 39-41);

wherein n+ and p+ areas are electrically isolated (col. 4, ll. 34-56; Fig. 10);

further comprising lateral trenches formed adjacent n+ and p+ areas (Fig. 10);

wherein the n+ and p+ areas are formed on an insulator (col. 3, ll. 22-30);

wherein the optical resonant cavity comprise orthogonal trenches formed at both ends of the optical resonant cavity to reflect light back into the optical resonant cavity (col. 5, ll. 17-25);

wherein the injection of carriers into the optical resonant cavity by applying a voltage across the p+ and n+ doped areas change the concentration of free carriers in the optical resonant cavity (col. 4, ll. 34-41);

wherein the optical resonant cavity comprises a planar micro cavity (Fig. 4);

wherein the planar micro cavity comprises a rib waveguide (Fig. 4);

wherein the optical resonant cavity comprises a distributed Bragg reflector formed at both ends of the rib waveguide ('305' Fig. 7B- Bragg reflectors are formed across the entire length of the rib waveguide, therefore they are at least 'formed at both ends' in addition to being formed in the middle portion of the rib waveguide).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (US 5,563,902).

Xu reference discloses an optical device as discussed above. However, it does not teach that the rib waveguide is formed of silicon on insulator (SOI). However, the use of silicon is well known and common in the semiconductor laser/ modulator art. Advantages and desirability of using silicon material (i.e. SOI devices) are also well known in the art, in that silicon material provides cost effective optoelectronic material with well-established, predictable optical and electrical characteristics. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Xu to use silicon material.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571)272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sung Pak/  
Sung H. Pak  
Primary Patent Examiner  
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